



DESCRIPTION OF MAP UNITS

- Qs** Sand dunes (Holocene) Windblown sand and dune sand
- Qb** Flood-basin deposits (Holocene) Clay, silt, and some sand; near Stockton consist of muck, peat, and other organic soils. In places may include part of the Modesto Formation (Pleistocene)
- Qr** River deposits (Holocene) Gravel, sand, silt, and minor amounts of clay; deposited along channels, flood plains, and natural levees of main streams. In places may include part of Modesto Formation (Pleistocene)
- QTl** Lacustrine and marsh deposits (Pliocene to Holocene) Clay, silt, and some sand; in subsurface include three widespread clays: A clay (Pleistocene and Holocene?); C clay (Pleistocene); and modified E clay (Pleistocene), includes Corcoran Clay Member of Tulare and Turlock Lake Formations
- QTc** Continental rocks and deposits (Miocene to Holocene) Heterogeneous mix of generally poorly sorted clay, silt, sand, and gravel; some beds of claystone, siltstone, sandstone, and conglomerate. Include some informal units: younger alluvium (Holocene), older alluvium (Pleistocene and Holocene?) and continental deposits (Pliocene and Pleistocene); three formations of Pleistocene age: Modesto, Riverbank, and Turlock Lake; Tulare Formation (Pliocene and Pleistocene) on western side of valley, Laguna Formation (Pliocene) on eastern side, and Kern River Formation (Miocene to Pleistocene?) on southeastern part
- Tvd** Volcanic rocks and deposits (Miocene and Pliocene) Massive tuff with large fragments of vesicular basalt northwest of Tracy; tuff, and volcanic breccia at south end of valley
- Tcpcm** Continental rocks and deposits (Miocene and Pliocene) Gravel, sand, silt, clay, conglomerate, sandstone, siltstone, and claystone, contain andesitic material. Principally Mehrten Formation (Miocene and Pliocene) on eastern side of valley; include continental equivalents of Etchequin Formation (Miocene and Pliocene) on western side of valley, and Chanac Formation (Miocene) on southern part
- Tcmo** Continental and marine rocks and deposits (Miocene and Pliocene) Gravel, sand, silt, clay, silty sandstone, and siltstone. Include continental and marine equivalents of San Joaquin Formation (Pliocene) and Etchequin Formation (Miocene and Pliocene)
- Tm** Marine rocks and deposits (Eocene, Oligocene, Miocene, and Pliocene) Sand, clay, silt, sandstone, shale, mudstone, and siltstone. On western side of valley include the San Joaquin and Etchequin Formations, Tumbler Formation (Oligocene and Miocene) and Kreyenhagen Formation (Eocene). On southeastern side include the Santa Margarita Formation of various authors, the Round Mountain Silt, the Olcese Sand, the Freeman Silt, and the Jewett Sand (including the Pyramid Hill Sand Member) (all Miocene), and the Vedder Sand (Oligocene)
- Tcmo** Continental rocks and deposits (Oligocene and Miocene) Gravel, conglomerate, sand, tuffaceous sand, clay, and sandy clay; contain rhyolitic material on eastern side of valley. Principally Valley Springs Formation (Oligocene and Miocene) on eastern side of valley; unnamed fanglomerates (Miocene) and Bena Gravel (Miocene) in the southern part
- Tcme** Continental rocks and deposits (Eocene to Miocene) Conglomerate, sandstone, consolidated fanglomerate, claystone, tuff and tuff breccia; near Fresno consist of tuffaceous sand and gravel. Near Bakersfield include the Bealville Fanglomerate (Oligocene and Miocene) and the Walker Formation (Eocene to Miocene)
- Tce** Continental rocks and deposits (Eocene) Conglomerate and sandstone; along eastern side of valley contain anauxite. Principally lone Formation (Eocene) on eastern side of valley
- Unconformity**
- pTs** Marine rocks (Pre-Tertiary) Sandstone, shale, siltstone, and some limestone, chiefly on western side of valley; in places contain abundant secondary gypsum. Include Moreno Formation (Cretaceous and Paleocene) and Panoche Formation (Cretaceous)
- pTg** Granitic rocks (Pre-Tertiary) Chiefly granitic rocks on eastern side of valley, in places consists of mafic intrusive rocks
- pTm** Metamorphic rocks (Pre-Tertiary) Metasedimentary, metavolcanic and other metamorphic rocks on eastern side of valley

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INTEGRATED REGIONAL GROUNDWATER
MANAGEMENT PLAN FOR THE MODESTO BASIN
Geology Map

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FIGURE 4-2

SOURCE: USGS, PP 1401-C Plate 2, 1969.